

PARTIAL TRANSLATION OF JP 2003-115456 A

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Title of the Invention: METHOD FOR MANUFACTURING  
SEMICONDUCTOR DEVICE

Patent Application Number: 2001-310766

Filing Date: October 5, 2001

Inventors: Koki INOUE et al.

Applicant: Semiconductor Energy Laboratory Co., Ltd.

(Page 4, left column, line 9–line 26)

[0021] In the above configuration, it is desirable to use a silicon film as the amorphous semiconductor film. In addition to an amorphous silicon film, a compound semiconductor film with an amorphous structure, such as an amorphous silicon germanium film, may be applied. As a substrate on which the amorphous silicon film is to be formed, a glass substrate, a quartz substrate, a silicon substrate, a plastic substrate, a metal substrate, a stainless substrate, a flexible substrate, or the like may be used. Examples of the glass substrate include a substrate made of glass such as barium borosilicate glass, aluminoborosilicate glass, and the like. The flexible substrate refers to a film substrate made of PET, PES, PEN, acrylic, or the like. A semiconductor device manufactured by using the flexible substrate is expected to be lightweight. It is desirable to form an aluminum film (AlON, AlN, AlO, etc.), a carbon film (DLC (diamond-like carbon) etc.), or a barrier layer of SiN or the like on a front surface or on both the front surface and a rear surface of the flexible substrate as a single layer or multiple layers, thereby improving durability and the like.

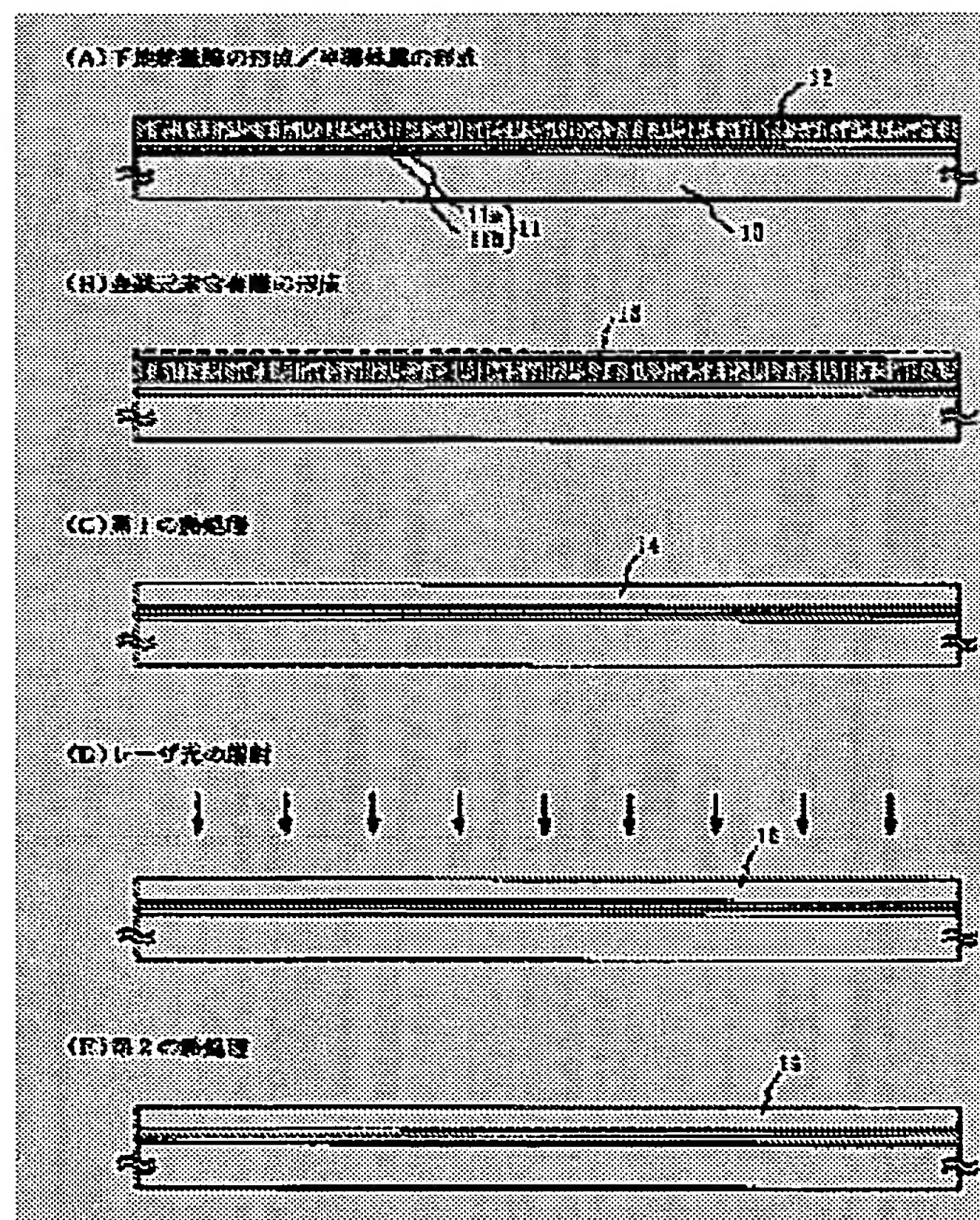
# SEMICONDUCTOR DEVICE AND METHOD OF FORMING IT

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Inventor: INOUE KOKI; SHIMOMURA AKIHISA  
Applicant: SEMICONDUCTOR ENERGY LAB  
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- european:  
Application number: JP20010310766 20011005  
Priority number(s): JP20010310766 20011005

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## Abstract of JP2003115456

**PROBLEM TO BE SOLVED:** To solve a problem in which the crystal grain size is as small as several nanometers to several ten nanometers because of a short melting time caused by a very short pulse width of a laser light emitted from an excimer laser and because of a low transmittance of the semiconductor film for the laser light.  
**SOLUTION:** This method is to form a semiconductor film having a large crystal-grain size by irradiating a crystalline semiconductor film formed by a thermal crystallization method utilizing metal elements with a laser light. Another constitution of this method is to form a semiconductor film having a low crystal-defect density and a large crystal-grain size by irradiating a crystalline semiconductor film formed by a thermal crystallization method utilizing metal elements with a laser light and by heat-treating again.



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